Rich Pelz' Personal Record (Rich Pelz' Contributions to Fluid Dynamics)

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Rich Pelz' Personal Record

The followings are his personal record upon the appointment of visiting professorship at RIMS.

I. CV

Curriculum Vitae - Dr. Richard B. Pelz - August 2001

Department of Mechanical and Aerospace Engineering
Rutgers, The State University of New Jersey
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(732) 445-3653, fax -5313, e-mail pelz@jove.rutgers.edu
SS# 187-38-8107, U.S. Citizen, Birth Date: January 8, 1957
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Education

Ph.D., Princeton University, Mechanical and Aerospace Engineering, 1983.

M.A., Princeton University, Mechanical and Aerospace Engineering, 1982.

New York University, Courant Institute of Mathematical Sciences, 1979-1980.

B.S., Virginia Polytechnic Institute and State University, Aerospace and Ocean Engineering, 1979.

Employment History

Rutgers University, Mechanical and Aerospace Engineering, Full Professor: 1998-present, Associate Professor with tenure: 1990-1998, Assistant Professor: 1986-1990.

Princeton University, Mechanical and Aerospace Engineering and Program in Applied and Computational Mathematics, Research Associate and Lecturer: 1984-1986.

Massachusetts Institute of Technology, Mathematics, Research Associate: 1983-1984.

Grumman Aerospace Corporation, Research & Aerodynamics Depts, Summers 1978-1980.

Courses Taught

Undergraduate: Fluid Mechanics, Aerodynamics, Intro to Engineering, Compressible Flows, Vibrations and Controls, Complex Variables, Computational Analysis and Design, Aerospace Propulsion.

Graduate: Fluid Mechanics, Computational Inviscid Fluid Dynamics, Computational Methods for Viscous Flows, Parallel Computing in Science and Engineering, Optimization Methods.

Research Interests

Fluid Mechanics: Turbulence, Vortex Dynamics, Aerodynamics, Design and Optimization, Numerical Methods, Applied Mathematics, Symbolic, High Performance and Parallel Computing, Global Climate Modeling.

Fellowships and Awards

Trustees' Research Fellowship, Rutgers University, 1990.

Gordon Bell Award for Large-scale Scientific Computing, Honorable Mention, 1988.

Henry Rutgers Research Fellowship, Rutgers University, 1986-8.

Selected Professional Activities

Principal Organizer, Isaac Newton Institute for Mathematical Sciences, Cambridge, England, "Geometry and Topology of Fluid Flows," September-December 2000.

Co-organizer, Royal Society Discussion Meeting, "Topological Methods in the Physical Sciences," London, November 15-16, 2000

Co-organizer, Conference on "Singularities in Classical, Quantum and Magnetic Fluids," Warwick, October 20-23 2000.

Chair, Conference in Honor of the 70th Birthday of Norman Zabusky, November 1998.

Editor, *Fluid Dynamics Research*, North American Region, 1995-present.

National Allocations Committee, NSF Cornell Supercomputer Center, 1995-1997.

Geophysical Fluid Dynamics Laboratory, Princeton University, Senior Research Scientist, July 94, July-Dec. 93, July-August, 1992.

Advisory and Organizational Board Member, Parallel Computational Fluid Dynamics conferences, 1990-1998.

Conference Chairperson, Parallel Computational Fluid Dynamics, New Brunswick, NJ, May 18-20, 1992.

Scientific Organizer, Workshop on Numerical and Theoretical Aspects of Turbulence, International Association for Mathematics and Computers in Simulation (IMACS), Rutgers University, Feb 10-11, 1994.

II. PUBLICATION LIST ETC.

Publications - Dr. Richard B. Pelz - August 2001

Dissertation

"Transonic flow calculations using triangular finite elements," Princeton University, Mechanical and Aerospace Engineering, October 1983. Director: Prof. Antony Jameson.

Editor of Published Books

Parallel Computational Fluid Dynamics '92 Editors: R.B. Pelz, A. Ecer, J. Häuser. (North-Holland, Amsterdam) 1993.

Chapters in Published Books

Pelz, R.B., "Parallel FFTs", in *Parallel Numerical Algorithms*, ICASE/LaRC Interdisciplinary Series in Science and Engineering, Eds. D.E. Keyes, A. Sameh, V. Venkatakrishnan. Kluwer pp. 245-266, 1996.

Orszag, S.A., Pelz, R.B. and Bayly, B.J., "Secondary instabilities, coherent structures, and turbulence," in Supercomputers and Fluid Dynamics, Ed. Kuwahara, Mendez and Orszag, Lecture Notes in Engineering, 24, (Springer, Berlin 1986) pp. 1-13.

Refereed Journal Articles

Aly, S. Ogot, M. M., Pelz, R. B. and Siclari, M., "A Decoupled Stochastic Approach to the Jig-Shape Aeroelastic Wing Design Problem," accepted to Journel of Aircraft (2001).

Pelz, R.B., "Symmetry and the Hydrodynamic Blowup Problem," Journal of Fluid Mechanics, **444** (2001), pp 343-382.

Greene, J.M. and Pelz, R.B., "Stability of postulated, self-similar, hydrodynamic blowup solutions," Phys. Rev. E **62**, 7982 (2000)

Boratav, O.N. and Pelz, R.B., "Coupling Between Anomalous Velocity And Passive Scalar Increments In Turbulence," The Physics of Fluids, **10**(9), 1998, pp. 2122-2124.

Pelz, R.B. and Gulak, Y., "Evidence for a Real-Time Singularity in Hydrodynamics from Time Series Analysis", Physical Review Letters, Vol. 79, No. 25 (1997), pp. 4998-5001.

Pelz, R.B., "Locally Self-similar, finite-time collapse in a high-symmetry vortex-filament model," Physical Review E, **55** 1997, pp. 1617-1626.

Boratav, O. and Pelz, R.B., "Structures and Structure Functions in the Inertial Range of Turbulence," The Physics of Fluids, **9**(5), 1997, pp. 1400-1415.

Aly, S. Ogot, M. M., and Pelz, R. B., "Stochastic Approach to Optimal Aerodynamic Shape Design," J. Aircraft, 33(5) 1996, pp. 956-961.

Boratav, O.N. and Pelz, R.B., "On the Local Topology Evolution of a High-Symmetry Flow," The Physics of Fluids Vol 7, No 7, (1995) pp. 1712-1731.

Boratav, O.N. and Pelz, R.B., "Locally Isotropic Pressure Hessian in a High-Symmetry Flow," The Physics of Fluids Vol 7, No 5, (1995) pp. 895-897.

Boratav, O.N. and Pelz, R.B., "Direct Numerical Simulation of Transition to Turbulence from a High-Symmetry Initial Condition," The Physics of Fluids.6 no.8 (1994), pp. 2757-2784.

Pelz, R.B., "Parallel Compact FFTs for Real Sequences," SIAM Journal of Scientific Computing, Vol 14, No. 4, (1993), pp.914-935.

Boratav, O.N., Pelz, R. B. and Zabusky, N. J., "Reconnection in orthogonally interacting

vortex tubes: Direct numerical simulations and quantifications," The Physics of Fluids A, 4 (1992).

Zabusky, N.J., Boratav, O.N., Pelz, R.B., Gao, M.,Silver, D. and Cooper, S., "Emergence of coherent patterns of vortex stretching during reconnection: A scattering paradigm," Physical Review Letters, 67 n 18, pp.2469 (1991).

Pelz, R.B., "Parallel Fourier spectral methods on ensemble architectures," Computer Methods in Applied Mechanics and Engineering, 89, pp. 529-542, (1991).

Pelz, R.B., "The parallel Fourier pseudospectral method," Journal of Computational Physics, 92, pp. 296-312, (1991).

Pelz, R.B. "Pseudospectral methods on massively parallel computers," Computer Methods in Applied Mechanics and Engineering, 80, pp. 493-503, (1990).

Goldhirsch, I., Pelz, R.B. and Orszag, S.A., "Numerical simulation of thermal convection in a two dimensional box," Journal of Fluid Mechanics 199, pp. 1-28, (1989).

Shtilman, L., Pelz, R.B. and Tsinober, A., "Numerical investigation of helicity in turbulent flows," Computers in Fluids, 16, No. 3, pp. 341-347 (1988).

Yakhot, V. and Pelz, R.B., "Large-scale structure generation by anisotropic small-scale flows," The Physics of Fluids, 30, pp. 1272-1277 (1987).

Pelz, R.B., Shtilman, L. and Tsinober, A.. "The helical nature of unforced turbulent flows," The Physics of Fluids, 29, pp. 3506-3508 (1986).

Shtilman, L., Levich, E., Pelz, R.B., Orszag, S.A. and Tsinober, A., "On the role of helicity in complex fluid flow," Physics Letters, 113A, pp. 32-37 (1985).

Pelz, R.B., Yakhot, V., Orszag, S.A., Shtilman, L. and Levich, E., "Velocity-vorticity patterns in turbulent flow," Physical Review Letters, 54, pp. 2505-2508 (1985).

Pelz, R.B. and Jameson, A., "Transonic flow calculations using triangular finite elements," AIAA Journal, 23, pp. 569-576 (1985).

Refereed Conference Proceedings

R. B. Pelz "A Candidate for hydrodynamic blowup: octahedral, vortical flow," to ap-

pear in Geometry and Topology of Fluids Flows, Ricca ed., NATO ASI Series, (Kluwer, Dordrecht), 2001.

Cantelmi, F., Pelz, R.B. and Ogot, M.M., "A Generic Cooling Schedule for Simulated Annealing," 20th Design Automation Conference Sept. 2000, Baltimore, MD.

Cantelmi, F., Pelz, R.B., and Ogot, M.M., "Stochastic Optimization for Aircraft Preliminary Design," AIAA Paper 98-4773, 7th AIAA/USAF/NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, Sept. 2-4, 1998, St. Louis, MO.

Pelz, R.B, Gulak, Y., Greene, J.M. and Boratav, O.N., "On the Finite-time Singularity Problem in Hydrodynamics," Second Monte Verita Colloquium on Fundamental Problematic Issues in Turbulence, in *Trends in Mathematics* (Birkhäuser, Basel) 1999, pp. 33-40.

Aly, S., Ogot, M.M., Pelz, R.B., and Siclari, M., "A Decoupled Stochastic Approach to the Jig-Shape Aeroelastic Wing Design Problem," AIAA Paper No. 98-0906, 36th Aerospace Sciences Meeting, Reno, NV, Jan. 12-15, 1998, 11 pages.

Pelz, R.B., Ogot, M.M., Aly, S., Cantelmi, F., & Burke, B. "Global Stochastic Methods in MDO/CFD" AIAA Paper No. 97-0352, 35th Aerospace Sciences Meeting, Reno, NV.

Boratav, O.N. and Pelz, R.B., "Pressure and Intermittency in the Inertial Range of Turbulence," in the Workshop on Turbulence Modeling and Vortex Dynamics, Istanbul, Sept 1996, Lecture Notes in Physics, Vol 491, Boratav, Eden, Erzan (eds.) Springer-Verlag (1997).

Ogot, M. M., Aly, S.,Pelz, R. B., Marconi, F. and Siclari, M., (1996) "Stochastic Versus Gradient-based Optimizers for CFD Design," AIAA Paper No. 96-0332, 34th Aerospace Sciences Meeting, Reno, NV.

Aly, S., Marconi, F., Ogot, M.M., Pelz, R.B. and Siclari, M, "Stochastic Optimization Applied to CFD Design," AIAA 95-1647, 12th AIAA CFD Conference, San Diego, June 1995.

Aly, S., Ogot, M.M. and Pelz, R.B., "An improved Simulated Annealing Algorithm," Proceeding of the 21th ASME Design Automation Conference, Boston, September 1995.

Zhao, Z. and Pelz, R.B., "A Parallel, Implicit, Iterative Solver for Multi-element Config-

urations," proceeding of Parallel CFD '95, Pasadena, CA June 26-28, 1995.

Pelz, R.B. and Boratav, O.N., "On a Possible Euler Singularity During Transition in a High-Symmetry Flow," proceedings of Small-Scale Structures in Three-Dimensional Hydro and Magneto Hydrodynamic Turbulence, January 10-13, 1995, Nice, Eds. M.Meneguzzi, A.Pouquet, P.L.Sulem, Lecture Notes in Physics 462, Springer, Berlin, pp 25-32.

Pelz, R.B."A Parallel, Compact FFT for Real Symmetric Sequences," proceedings of the 7th SIAM Conference on Parallel Processing for Scientific Computing, pp 27-32, Feb 1995, San Francisco.

Kimura, Y. and Pelz, R.B., "Search for Complex Time Singularities in Navier Stokes Turbulence," in *Unstable and Turbulence Motion of Fluid*, eds. S. Kida (World Scientific, Singapore) 1994, pp. 91-101.

Chyczewski, T.S, Marconi, F., Pelz, R.B. and Curchitser, E., "Solution of the Euler and Navier-Stokes Equations on Parallel Processors Using a Transposed/Thomas ADI Algorithm" AIAA 93-3310, 11th Computational Fluid Dynamics Conference, Orlando, FL 1993.

Bailey, D.H, Krasny, R and Pelz, R., "Multiple Precision, Multiple Processor Vortex Roll-Up Computation," proceedings of the 6th SIAM Conference on Parallel Processing for Scientific Computing, pp 52-56, Mar 1993, Norfolk, VA.

Pelz, R.,B. and Stern, W.F, "A Balanced, Parallel Algorithm for Spectral Global Climate Models" proceedings of the 6th SIAM Conference on Parallel Processing for Scientific Computing, pp 236-129, Mar 1993, Norfolk, VA.

R.B. Pelz, T.Scheidegger, and N. Zabusky, "Compressible Vortex Reconnection on the Connection Machine," Parallel CFD'92, eds. Pelz, Ecer, Häuser, (North-Holland, Amsterdam) 1993.

Boratav, O.N., Pelz,R. B. and Zabusky, N. J., "On vortex reconnection and turbulence," in Topological Aspects of the Dynamics of Fluids and Plasmas, Moffatt, Zaslavsky, Comte and Tabor eds., NATO ASI Series, (Kluwer, Dordrecht), 1992, pp.363-376.

Curchitser, E. and Pelz, R.B. and Marconi, F., "Solution of the Euler and Navier-Stokes Equations on MIMD Multiprocessors Using Cyclic Reduction" AIAA 92-0561, Aerospace

Sciences Meeting, Reno 1992.

Boratav, O.N., Pelz,R. B. and Zabusky, N. J., "Winding and reconnection mechanisms of closely interacting vortex tubes in three dimensions," in Vortex Dynamics and Vortex Methods, Greengard & Anderson eds., American Mathematical Society (AMS), Lectures in Applied Mathematics, Vol.28, (1991).

Curchitser, E. and Pelz, R.B., "Implementation of the Euler Equations on MIMD, Distributed Memory Multiprocessors Using Cyclic Reduction Algorithms" Parallel CFD 91, eds. Reinsch, Schmidt, Ecer, Häuser, Periaux, (North-Holland, Amsterdam) 1992 pp 97-112.

Pelz, R.B., "Hypercube FFT and Fourier pseudospectral method," Parallel CFD: Implementation and Results, ed. H. Simon (MIT Press, Cambridge, 1992) pp. 189-214.

Pelz, R.B., "Pseudospectral methods on massively parallel computers," in Spectral and High order Methods for Partial Differential Equations, Eds. Canuto and Quarteroni, (North-Holland, Netherlands, 1990), pp. 493-503.

Pelz, R.B., "The parallel Chebyshev pseudospectral method: cosine transform and derivative recursion," Proceeding of the Fourth Conference on Hypercubes, Concurrent Computers, and Applications, (1989), pp. 433-439.

Pelz, R.B., "Hypercube algorithms for turbulence simulation," 11th International Conference on Numerical Methods in Fluid Mechanics, Ed. D.L. Dwoyer, M.Y. Hussaini, R.G. Voigt, Lecture Notes in Physics, 323, (Springer, Berlin 1989) pp. 462-468.

Pelz, R.B., "Large-scale spectral simulation of the Navier-Stokes equations on a hypercube computer," AIAA Paper 88-3642, in First National Fluid Dynamics Congress, pp. 201-206 (1988).

Orszag S.A., Pelz, R.B. and Bayly, B.J., "Secondary instabilities, coherent structures, and turbulence," AIAA paper 85-1486-CP, 7th Computational Fluid Dynamics Conference, Cincinnati, OH (1985).

Yakhot, V., Orszag, S.A. and Pelz, R.B., "Renormalization group-based subgrid scale turbulence closures," Ninth International Conference on Numerical Methods in Fluid Mechanics, Ed. Soubbaramayer and J.P. Boujot, Lecture Notes in Physics, 218, (Springer, Berlin 1985) pp 592-596.

Pelz, R.B. and Jameson, A., "Transonic flow calculations using triangular finite elements," AIAA paper 83-1922, 5th AIAA Computational Fluid Dynamics Conference, Danvers, MA (1983).

Steinhoff, J. and Pelz, R.B., "Multigrid-ADI solution of the full potential equation for airfoils mapped to slits," Computers in Flow Predictions and Fluid Dynamics Experiments, ASME Winter Meeting, Washington, DC (1981).

Invited Presentations at Conferences

R. B. Pelz, "Point collapse in octahedral, vortical flows" IUTAM SYmposium on Tubes, Sheets and Singularities in Fluid Dynamics, 2-7 September 2001, Zakopane, Poland.

R.B. Pelz "On the Hydrodynamic Blowup Problem " Workshop on Singularities in Classical, Quantum and Magnetic Fluids, University of Warwick, October 20-23, 2000.

R. B. Pelz, "A History of the Hydrodynamic Blowup Problem," 2 lectures in NATO Workshop on Geometry and Topology of Fluid Flows. Newton Institute Sept 11-22, 2000.

Pelz, R.B., "Evidence for a Real-Time Singularity of the Incompressible Euler Equations from a Smooth, Symmetric Initial Flow," Conference on The Euler Equations, Navier-Stokes Equations and Singularities, Ohio State, April 18-20, 1997.

Pelz, R.B., "Finite-Time Singularities in Ideal Hydrodynamics," Statistical Mechanics Conference, Rutgers University, May 9-10, 1996. Mini-review

Pelz, R.B. "Parallel Aspects of Stochastic Optimization in CFD Design," Parallel CFD '96, Capri, Italy.

Pelz, R.B., "Finite-Time Singularities in Ideal Hydrodynamics," G.I. Taylor Symposium, October 31, 1995. New Orleans.

Pelz, R.B., "An Euler Singularity in High-Symmetry, Incompressible Flow," Workshop on MHD Turbulence, Institute for Theoretical Physics, San Barbara, CA. 1995.

Pelz, R.B., "Computational Evidence of a Singularity in a High-Symmetry Flow," 1995 March Meeting of the APS, San Jose, CA.

Pelz, R.B., "Parallel FFTs", ICASE/LaRC Workshop on Parallel Numerical Algorithms, May 23- 25, 1994.

Pelz, R.B., "Parallel FFTs and pseudospectral methods," Physics Computing'93, Albuquerque, June 1993.

Pelz, R.B., "Spectral methods on ensemble architectures," Proceedings of the Second World Congress on Computational Mechanics, Stuttgart, Germany, Aug. 1990.

Pelz, R.B., "Vortex Reconnection," International Symposium on Structures in Continuous Media, USSR, June 11-20, 1990.

Refereed Conference Presentations Without Proceedings

Pelz, R.B., "Early-Time Behavior of a Highly Symmetric, Viscous Flow at Resolution 1024^3", Workshop on Turbulence, National Center for Atmospheric Research, August 11-14, 1992.

T. Wei and R.B.Pelz, "Trailing edge turbulence modification using serrations," ASME Fluids Engineering Conference, Los Angeles, CA, June 21-23, 1992.

Pelz, R.B., "Vortex dynamics and turbulence on ensemble architectures," 2nd International Conference on Industrial and Applied Mathematics, Washington, DC, July 8-12, 1991.

Boratav, O, Pelz, R.B., Silver, D and Zabusky, N, "Collapse and reconnection of orthogonally offset vortex tubes in three dimensions," 2nd International Conference on Industrial and Applied Mathematics, Washington, DC, July 8-12, 1991.

Pelz, R.B., "A symmetric FFT for MIMD hypercubes," 5th SIAM Conference on Parallel Processing for Scientific Computing, Houston, March 25-27, 1991.

Pelz, R.B., Israeli, M. and Orszag, S.A., "Nonlinear effects in thermocapillary convection," International Conference on Spectral and High order Methods for Partial Differential Equations, Como, Italy (1989).

Pelz, R.B., "Vortex dynamics and spectral methods," Parallel CFD '89: implementation and results using MIMD computers, Los Angeles, CA (1989),.

Pelz, R.B. and Peskin, R., "Parallel computation of Eulerian and Lagrangian turbulence," First International Conference on Industrial and Applied Mathematics, Paris, France (1987).

Levich, E., Shtilman, L., Tsinober, A. and Pelz, R.B., "Some helicity related computational results," Second Nobeyama Workshop on Fluid Mechanics and Supercomputers,

Nobeyama, Japan (1987).

Shtilman, L., Tsinober, A. and Pelz, R.B., "Numerical investigation of helicity in turbulent flow," Conference on Experiments in Turbulent Flows, Rolla, MO (1986).

Shtilman, L., Pelz, R.B. and Tsinober, A., "On the helical nature of unforced turbulent flows," Fluid Mechanics in the Spirit of G.I. Taylor, Cambridge, England, poster (1986).

Pelz, R.B., Shtilman, L., Levich, E., Orszag, S.A. and Tsinober, A., "On the role of helicity in turbulent flow," EUROMECH 199, Direct and Large Eddy Simulation of Turbulent Flows, Munich, West Germany (1985).

Shtilman, L., Pelz, R.B., Orszag, S.A., Yakhot, V. and Levich, E., "Velocity-vorticity patterns in turbulent flows," 5th Physico-Chemical Hydrodynamics Conference, Tel-Aviv, Israel (1984).

Conference Presentations

Greene,J & Pelz, R.B. "Asymptotic structure of blowup solutions to the equations of inviscid, incompressible fluid flow." Conference of the American Physical Society, Division of Fluid Dynamics, San Diego (2001).

Pelz, R.B., Gulak,Y. & Baron, S. "The algebra of blowup solutions," Conference of the American Physical Society, Division of Fluid Dynamics, San Diego (2001).

Pelz, R.B., "Symmetry and Singularity in Incompressible Flows," Special Session of the American Mathematical Society's Eastern Section Meeting, "Vorticity in Fluid Flows: Analysis and Methods," April 1-2, 2000.

Pelz, R.B., "Symmetry and Singularity in Incompressible Flows" Conference of the American Physical Society, Division of Fluid Dynamics, New Orleans (1999).

Pelz, R.B. and Greene, J.M., "Towards a Numerical Proof of the Hydrodynamic Blowup Problem," Conference of the American Physical Society, Division of Fluid Dynamics, Philadelphia (1998).

Gulak, Y.F. and Pelz, R.B., "On the Brady - Van Dyke Paradox," Conference of the American Physical Society, Division of Fluid Dynamics, Philadelphia (1998).

Pelz, R.B. and Gulak, Y., "Evidence for a Real-Time Singularity in Hydrodynamics

from Time Series Analysis," Conference of the American Physical Society, Division of Fluid Dynamics, San Francisco (1997).

Greene, J.M. and Pelz, R.B., "On the Stability of Renormalized Hydrodynamic Blowup Solutions," Conference of the American Physical Society, Division of Fluid Dynamics, San Francisco (1997).

Boratav, O.N. and Pelz, R.B., "Intermittency of Passive Scalars in the Inertial Range of Turbulence" Conference of the American Physical Society, Division of Fluid Dynamics, San Francisco (1997).

R.B. Pelz, M.M. Ogot, S. Aly, B. Burke, F. Marconi, M. Siclari "Stochastic Methods for Aircraft Design" Progress Report and presentation - Year 3 NASA Grantee Workshop, January 1997.

Pelz, R.B., "Self-Similar, Finite-Time Collapse in a Symmetric Vortex Filament Model," Conference of the American Physical Society, Division of Fluid Dynamics, Syracuse, NY (1996).

R.B. Pelz, M.M. Ogot, S. Aly, Z. Zhao, F. Marconi, M. Siclari, F. Austin, W. Van Nostrand, "Stochastic Methods for Aircraft Design" Progress Report and presentation - Year 2 NASA Grantee Workshop, November 1995.

Boratav, O.N. and Pelz, R.B., "Inertial Range of Turbulence: Test of Several Intermittency Models" Conference of the American Physical Society, Division of Fluid Dynamics, Irvine, CA (1995).

Pelz, R.B., "Vortex Filament Models of Finite Time Singularity" Conference of the American Physical Society, Division of Fluid Dynamics, Irvine, CA (1995).

R.B. Pelz, M.M. Ogot, S. Aly, Z. Zhao, F. Marconi, M. Siclari, F. Austin, W. Van Nostrand, "Stochastic Methods for Aircraft Design" Progress Report and presentation - Year 1 NASA Grantee Workshop, November 1994.

Boratav, O.N. and Pelz, R.B., "On the Local Topology Evolution of a High-Symmetric Flow," Conference of the American Physical Society, Division of Fluid Dynamics, Atlanta, GA (1994).

Pelz, R.B. and Gulak, Y., "On the Accuracy of Diffusion Particle Methods," Conference of the American Physical Society, Division of Fluid Dynamics, Atlanta, GA (1994).

Pelz, R.B. and Boratav, O.N., "Early-Time Behavior of a Viscous, Highly Symmetric Flow," Conference of the American Physical Society, Division of Fluid Dynamics, Tallahassi, FL (1992).

Pelz, R.B. "Turbulence and Complexity," Workshop on Geophysical Fluid Dynamics, Rutgers University, September 1992.

R.B. Pelz, "Computational Fluid Dynamics on Parallel Computers," Parallel / Distributed Computing Workshop '92, CAIP, March 24, 1992. Panel Discussion

O. N. Boratav, R. B. Pelz and N. J. Zabusky, "Evolution During Reconnection of the Strain Rate, Velocity Gradient Tensor Invariants," Conference of the American Physical Society, Division of Fluid Dynamics, Scotsdale, AR (1991).

R. B. Pelz, O. N. Boratav and N. J. Zabusky, "Fingering Mechanisms of Closely Interacting Vortex Tubes in Three Dimensions," Conference of the American Physical Society, Division of Fluid Dynamics, Scotsdale, AR (1991).

N. J. Zabusky, O. N. Boratav, R. B. Pelz, M. Gao, S. Cooper, and D. Silver, "Emergence of Coherent Patterns of Vortex Stretching During Reconnection," Conference of the American Physical Society, Division of Fluid Dynamics, Scotsdale, AR (1991).

S. Cooper, N. J. Zabusky, D. Silver, M. Gao, R. B. Pelz, O. N. Boratav and R. Samtaney, "Space-Time Diagrams and Volumes: Projections of Thresholded Functions for Visualizing and Quantifying 2D and 3D Evolving Phenomena," Conference of the American Physical Society, Division of Fluid Dynamics, Scotsdale, AR (1991).

Pelz, R.B. "Parallel Computing in Turbulence," AFOSR Conference on Turbulence Structure and Control, Columbus, Ohio (1991).

Pelz, R.B., "Fourier pseudospectral method on various parallel computers," Conference of the American Physical Society, Division of Fluid Dynamics, Ithaca, NY (1990).

Boratav, O., Pelz, R. and Zabusky, N. "Vortex scattering and reconnection: numerical simulation of closely interacting vortex tubes," Conference of the American Physical Society,

Division of Fluid Dynamics, Ithaca, NY (1990).

Scheidegger, T. and Pelz, R., "Acoustic wave / vortex interaction," Conference of the American Physical Society, Division of Fluid Dynamics, Ithaca, NY (1990).

Boratav, O.N., Pelz, R.B., Zabusky, N.J., Silver, D., Cooper, S.P., Appino, P.A., Liu, C.N. Rabenhorst, D.A. and Depillis, J., "Bursting Reconnection of Closely Interacting Vortices in Three Dimensions," Video entry in Gallery of Fluid Motion, Conference of the American Physical Society, Division of Fluid Dynamics, Ithaca, NY (1990).

Boratav, O.N., Pelz, R.B., Zabusky, N.J., Silver, D. and Cooper, S.P., "Vortex 'Plowing' and Counter-Helical Winding of Closely Interacting Vortex Tubes in Three Dimensions," Video entry in Gallery of Fluid Motion, Conference of the American Physical Society, Division of Fluid Dynamics, Ithaca, NY (1990).

Pelz, R.B., "A parallel Chebyshev pseudospectral method," Conference of the American Physical Society, Division of Fluid Dynamics, Stanford, CA (1989).

Boratav, O., Pelz, R., Zabusky, N. & Liu, S. "Asymmetric vortex reconnection," Video entry in: Gallery of Fluid Motion, Conference of the American Physical Society, Division of Fluid Dynamics, Stanford, CA (1989).

Boratav, O., Pelz, R., Zabusky, N., Silver, D. & Gu, S. "New morphologies in asymmetric vortex reconnection," Poster in: Gallery of Fluid Motion, Conference of the American Physical Society, Division of Fluid Dynamics, Stanford, CA (1989).

Pelz, R.B., "Parallel computations in fluid dynamics," Sixth Parallel Circus, Courant Institute of Mathematical Sciences, New York University (1989).

Pelz, R.B. "Spectral methods on hypercubes," Fourth Parallel Circus, New Brunswick, NJ (1988).

Orszag, S.A., Israeli, M. and Pelz, R.B. "Nonlinear effects in thermocapillary convection," Conference of the American Physical Society, Division of Fluid Dynamics, SUNY Buffalo, NY (1988).

Pelz, R.B. and Krasny, R., "Hypercube calculations of spiral structure in periodic vortex sheet roll- up," Conference of the American Physical Society, Division of Fluid Dynamics,

SUNY Buffalo, NY (1988).

Pelz, R.B. "Spectral methods on hypercube computers," Workshop on Mathematical Aspects of Vortex Dynamics, Leesburg, VA (1988).

Pelz, R.B. and Peskin, R., "CFD on hypercube parallel processors: pseudo-spectral methods and Lagrangian dynamics," Conference of the American Physical Society, Division of Fluid Dynamics, Eugene, OR (1987).

Bayly, B.J., Pelz, R.B. and Peskin, R. "On the ergodic paths of particles in generalized Beltrami flows," Conference of the American Physical Society, Division of Fluid Dynamics, Columbus, OH (1986).

Shi, A., Orszag, S.A. and Pelz, R.B., "Numerical solutions of double-diffusive convection in two and three dimensions," Conference of the American Physical Society, Division of Fluid Dynamics, Columbus, OH (1986).

Pelz, R.B. and Yakhot, V. "Numerical investigation of the inverse energy cascade in three- dimensional fluid flows," Conference of the American Physical Society, Division of Fluid Dynamics, Columbus, OH (1986).

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Pelz, R.B., Shtilman, L., Orszag, S.A., Tsinober, A. and Levich, E. "Numerical investigations of helical coherent structures in turbulent flows," Conference of the American Physical Society, Division of Fluid Dynamics, Tucson, AR (1985).

Pelz, R.B., Yakhot, V. and Orszag, S.A. "On velocity-vorticity patterns in transitional and turbulent flow," Conference of the American Physical Society, Division of Fluid Dynamics, Providence, RI (1984).

Other

Pelz, R.B., "Trigonometric Pseudo-Spectral Methods," "Fourier Pseudo-Spectral Methods" and "Chebyshev Pseudo-Spectral Methods," to appear in Encyclopaedia of Mathematics, Kluwer, Dordrecht. (2002).

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Invited Research Seminars at Universities and Research Laboratories

University of Minnisota, Mathematics Seminar, March 12, 2001.

Columbia University, Mechanical Engineering Seminar, March 9, 2001.

University of Bristol, Department of Mathematics, Applied Math Seminar, December 14, 2000

Heriot Watt University, Department of Mathematics, Applied Math Seminar, December 12, 2000.

Manchester University, Department of Mathematics, Applied Math Seminar, October 18, 2000

University of Cambridge, Department of Applied Mathematics and Theoretical Physics, Continuum Seminar, October 10, 2000.

University of California at Santa Barbara, Institute for Theoretical Physics, June 2000.

Princeton University, Fluid Mechanics Seminar, Mathematics Department, April 16, 1999

Cornell University, Fluid Mechanics Seminar, Chemical Engineering, December 2, 1998

University of Tennessee Space Institute, Aerospace Engineering, October 19, 1998

City College of the City University of New York, Levich Insitute, May 5, 1998.

Rensselaer Polytechnic Institute Mechanical and Aerospace Engineering, April 10, 1998.

Institute for Advanced Study, Princeton, NJ, March 13, 1998.

University of California, San Diego, Mechanical Engineering Seminar, August 26, 1997.

University of Southern California, Aerospace Engineering, August 27, 1997.

University of California, Los Angeles, Mathematics Department, August 20, 1997.

National Center for Atmospheric Research, Boulder, Geophysical Turbulence Program Seminar, June 25, 1997.

New Jersey Institute of Technology, Mathematics Seminar, Sept 1996.

University of Roma - 2, Physics Department, May 22, 1996.

University of Roma - 1, Engineering Department, May 23, 1996.

University of California, Los Angeles, Mathematics Department, June 28, 1995.

Rutgers University, Mathematical Physics Seminar, April 27, 1995.

University of Southern California, Aerospace Engineering, April 10, 1995.

Naval Research Laboratory, Laboratory for Computational Physics Seminar, April 3, 1995.

New York University, Courant Institute, Numerical Analysis Seminar, March 1995.

Geophysical Fluid Dynamics Laboratory, Princeton, Informal Seminar, January 14, 1994.

New Jersey Institute of Technology, Computer Engineering Seminar, April 14, 1993.

IBM TJ Watson Research Labs, Seminar, March 5, 1993.

Yale University, Mechanical Engineering Seminar, February 3, 1993.

Merck, Research Division, January, 1993.

University of Maryland, Plasma Physics Seminar, September 21 1992.

National Center for Atmospheric Research, Boulder, Scientific Computing Division Seminar, Aug 1992.

Grumman Aerospace Corporation, Research Department, April 13, 1992.

University of Southern California, Aerospace Engineering, October 30, 1991.

University of California at Santa Barbara, Institute for Theoretical Physics, October 9, 1991.

University of California at Santa Barbara, Institute for Theoretical Physics, August 26, 1991.

University of Toronto, Numerical Analysis Seminar, Computer Science, May 24, 1991.

National Center for Atmospheric Research, Boulder, Seminar, May 22, 1991.

New York University, Courant Institute, Applied Math Seminar, April 19, 1991.

University of Houston, Mechanical Engineering, March 22, 1991.

Ecole Polytechnique Federale de Lausanne, Institute of Fluid Mechanics, 4 seminars, Jan 1991.

Observatoire de Nice, France, January 11, 1991.

CERFACS Institute, University of Toulouse, France, January 4, 1991.

University of Arizona at Tucson, Mathematics Department, October 19, 1990.

Los Alamos National Laboratory, CNLS, October 17, 1990.

Institute for Mathematics and Dataprocessing (GMD), Bonn, West Germany, Aug 1990.

German Institute for Air and Space Travel (DLR), Göttingen, West Germany, Aug 1990.

Levich Institute of Physico-Chemical Hydrodynamics, CUNY, July 24, 1990.

Space Research Institute, Moscow, USSR, June 22, 1990.

Institute for Atmospheric Physics, Moscow, USSR, June 21, 1990.

University of Michigan, Applied Mathematics, April 1990.

Grumman Aerospace Corporation, Research Department, Feb. 7, 1990.

University of Southern California, Aerospace Engineering, Invited Lectures, January 1990.

California Institute of Technology, Applied Mathematics Seminar, January 3, 1990.

New York University, Courant Institute, Numerical Analysis Seminar, December 8, 1989.

Johns Hopkins University, Mechanical Engineering Seminar, November 16, 1989.

Massachusetts Institute of Technology, Mechanical Engineering Department, October, 1989.

Grumman Aerospace Corporation, Research Department, June 7, 1989.

Columbia University, Applied Math Department, March 27, 1989.

Brown University, Center for Fluid Mechanics, March 21, 1989.

University of Southern California, Aerospace Engineering, March 8, 1989.

ICASE Seminar, NASA Langley Research Center, January 1989.

University of California at Santa Barbara, Institute for Theoretical Physics, Sept 1988.

Sandia National Laboratories, Department of Fluid and Thermal Sciences, August 22,

Grumman Aerospace Corporation, Research Department, June 13, 1988.

IBM, Scientific Engineering Computational Department, June 3, 1988.

Princeton University, Geophysical Fluid Dynamics Laboratory, April 21, 1988.

Princeton University, Plasma Physics Laboratory, Theory Group, April 7, 1988.

Rutgers University, Graduate Seminar in Computer Science, November, 1987.

Rutgers University, Graduate Seminar in Computer Science, October 1987.

University of Southern California, Aerospace Engineering, May 1987.

University of Maryland, Mechanical Engineering, April 1987.

Rutgers University, Computer Science, Parallel and Supercomputing Seminar, Feb 1987.

NASA Lewis Research Center, Cleveland, May 1986.

ICASE, NASA Langley Research Center, Hampton, VA, April 1986.

University of California at Berkeley, Mechanical Engineering, March 1986.

Old Dominion University, Mechanical Engineering and Mechanics, March 1986.

Rutgers University, Mechanical and Aerospace Engineering, March 1986.

University of Arizona at Tucson, Mathematics Department, February 1986.

Stanford University, Mechanical Engineering, February 1986.

State University of New York at Stony Brook, Mechanical Engineering, January 1986.

University of California at Los Angeles, Mathematics Department, January 1986.

University of Michigan, Aerospace Engineering, January 1986.

University of Washington, Aeronautics and Astronautics, January 1986.

Courant Institute, New York University, Special Applied Math Seminar, October 1985.

University of Pittsburgh, Mechanical Engineering, October 1985.

Virginia Polytechnic Institute and State University, Aerospace and Ocean Engineering, May 1985.

University of Michigan, Aerospace Engineering, March 1985.

Massachusetts Institute of Technology, Aerospace Engineering, November 1983.